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# Distortion In Horror

A look at alternative ways of creating fear

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## **Abstract**

The mainstream videogame horror industry features a great deal of monsters and/or weapons. Is there a way to avoid this and still create a game that instills fear in its player? We delved in to the discussion revolving around the ‘Uncanny Valley’ phenomena in order to find the answer to that question. Our results were not entirely conclusive, but we do believe there is an alternative to the brandishing of weapons at countless monsters. That alternative is the instinctual discomfort created by the ‘uncanny’, and that ‘uncanny’ feeling can be created by distorting things that were once normal. By understanding how to make use of distortion one can create an ‘uncanny’ or disturbing setting that could replace the current reliance on monsters and weapons.

Keywords: Distortion, Uncanny, Horror, Fear, Video Games

## **Abstrakt**

Dagens större skräckspel förlitar sig tungt på monster kombinerat med ett stort antal skjutvapen. Finns det något sätt att undvika att förlita sig på dessa klichéer och samtidigt skapa en känsla av skräck och obehag i en spelare? Vi undersökte den aktiva diskussion kring ’Uncanny Valley’ fenomenet för att få svar. Våra resultat var inte helt konklusiva, men vi tror starkt på att alternativ till spelindustrins nuvarande metod för att skapa obehag. Det alternativet är det instinktuella obehaget som skapas av ”the uncanny”. Den känslan kan skapas med hjälp av förvrängning. Genom att få en djupare förståelse av hur man kan använda sig av förvrängning så kan man skapa ett nytt slags obehag. Detta kan man använda som ett alternativ till det nuvarande användandet av monster och vapen.

Nyckelord: Förvrängning, Obehag, Skräck, Rädsla, Datorspel

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## **2 INTRODUCTION**

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Horror is a genre both loved and hated, as it represents the more primitive part of ourselves. Dr. James Iaccino a professor in psychology at Benedictine University states: ‘As civilization progresses to higher stages of consciousness, newer interpretations of those age-old [horror] myths become necessary so that the links with humankind's archaic past can be appropriately maintained’ (1994 p.181). Our love for horror is something primitive that has been with us for a long time. Several theories exist which try to explain why humans feel the need to experience the emotion of fear, an emotion that could easily be argued to be a negative emotion. So far none of the theories have proven to be conclusive, nevertheless, horror is something we cannot rid ourselves of, nor should we.

Alas, in the video game market, all is not right; not according to us at least. We have found that most major company titles, that were meant to be horror games, have inevitably drifted more and more towards the shoot'em up style of action games, and less toward the psychological and horrifying. Examples of this we would say, you can find in the famous series such as Resident Evil (Capcom 1996), Silent Hill (Konami 1999) and Dead Space (Visceral Games 2008). Where the early releases of the games focused mainly on the horrific narrative, and the subsequent titles’ design have focused more on killing big bad monsters. What we would like to examine is the possibility of finding new ways to create and maintain uncanny and frightening atmospheres, without relying solely on monsters.

## **3 PROBLEM AREA**

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### **3.1 BACKGROUND**

In a study by professor Blumstein, at the Institute of Environment and Sustainability, and his colleague Récapet (2009), we discovered what Blumstein has later called, the sound of fear. They concluded, through a series of tests, that animals when, extraordinarily frightened, scream with such power that their vocal chords lose the power to produce clean sounds, and thusly, their screams get distorted. They have also shown that, at the very least, marmots react far more to an alarm call that has been distorted, compared to an alarm call that has not.

Another interesting phenomena called ‘The Uncanny Valley’ was proposed by Japanese roboticist Masahiro Mori (1970). It proposes that the closer something resembles a human the empathy we feel towards said object. Up unto a certain point, where our positive emotions related to whatever creature we are applying the hypothesis on, take a very distinct dip into the ‘Uncanny Valley’.

In short what we would like to examine is how distorting or deforming natural or ‘normal’ things can create a feeling of fear in humans.

### **3.2 RESEARCH QUESTION**

*How can one use distortion in order to create a feeling of eeriness and/or fear in humans in video games?*

### **3.3 AIM**

The purpose of this investigation is to create a greater understanding of how we, as game developers, can use the tools provided to us by modern technology to create an uncanny feeling of fear and discomfort, and decrease the horror developer community's reliance on monsters and jump scares.

### **3.4 WORK PROCESS**

We will start off this project by doing research, to see what is currently known about the subject. Following this we shall create a short playable level based on said research. During the actual production Nils will be working on the sound design and Carolin will be doing any programming

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necessary. We are also planning on cooperating with four graphical artists, two designers and another sound designer. The cooperation will entail the creation of a joint game level and the sharing of content. The text you are reading will be co-written by both of us.

### 3.5 **PREVIOUS RESEARCH**

Horror has long been an area of interest to a great deal of people. Why would we want to frighten ourselves the way we do? Thanks to the great interest in horror, there is plenty of material to examine. But before we begin we should define our terms.

#### 3.5.1 **The Uncanny**

There has been a lot of research on ‘the uncanny’. But what exactly is ‘the uncanny’? The Oxford Dictionary defines it as, ‘strange or mysterious, especially in an unsettling way’ (2014).

The first example of research available on this subject, that we are aware of, is an article published by the German psychologist Ernst Jentsch called ‘On the psychology of the Uncanny’ (1906). Jentsch described the uncanny as the mental state instilled when one was unable to distinguish between the living and the dead or differentiate between what appears to be inanimate and animate. Jentsch repeatedly refers to the feeling of the uncanny, as an emotion that is more frequently experienced in those who are less intelligent.

‘Fantasy, which is indeed always a poet, is able now and then to conjure up the most detailed terrifying visions out of the most harmless and indifferent phenomena; and this is done all the more substantially, the weaker the critical sense that is present and the more the prevailing psychical background is affectively tinged. This is why women, children and dreamers are also particularly subject to the stirrings of the uncanny and the danger of seeing spirits and ghosts.’ (1906 p.12). This is a hypothesis that is shared by Sigmund Freud, in his paper ‘Uncanny’ (1919).

It is interesting to see how Jentsch asserts that less rational people will more easily succumb to the feeling of uncanniness. It is also somewhat difficult to make use of, from a game perspective, as we are not really planning on targeting children or childish adults, but rather a more mature audience. Nevertheless, trying to appeal to said peoples more childish fears could definitely prove useful.

Freud goes on, in his previously mentioned paper, to define the word ‘uncanny’, or as it was called

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in his paper, 'unheimlich', in the following way:

'The German word "unheimlich" is obviously the opposite of "heimlich" ['homely'], "heimisch" ["native"] the opposite of what is familiar; and we are tempted to conclude that what is "uncanny" is frightening precisely because it is not known and familiar. Naturally not everything that is new and unfamiliar is frightening, however; the relation is not capable of inversion.' (1919 p.1).

Freud agrees with Jentsch when he stresses that one of the reasons we feel uncanniness is the fact that we believe, in the more primitive part of ourselves, that all things are animate, and in fact animate in the same way we are.

'The child of nature populates his environment with demons; small children speak in all seriousness to a chair, to their spoon, to an old rag, and so on, hitting out full of anger at lifeless things in order to punish them. Even in highly cultivated Greece, a dryad still lived in every tree.' (Jentsch 1906 p.13).

While Freud agrees with this view, he also asserts that the feeling of uncanniness is, in part, evoked by the attaching of superstitious beliefs to random, normal, events. As an example Freud writes 'For instance, we naturally attach no importance to the event when we hand in an overcoat and get a cloakroom ticket with the number, let us say, 62; or when we find that our cabin on a ship bears that number. But the impression is altered if two such events, each in itself indifferent, happen close together — if we come across the number 62 several times in a single day, or if we begin to notice that everything which has a number — addresses, hotel rooms, compartments in railway trains — invariably has the same one, or at all events one which contains the same figures. We do feel this to be uncanny.' (1919 p.9).

Freud presents two different hypotheses to explain the feeling of uncanniness. The first being that uncanniness is felt when an emotional impulse has been repressed into anxiety, and an event that reminds our psyche of this emotional impulse recurs. As in his example of the number 62 recurring over and over, every time one sees the number, the feeling of uncanniness will be heightened. In his second hypothesis he asserts that the uncanny is not something alien or foreign, but instead a feeling of familiarity that has been repressed.

The discussion on what the uncanny actually is still rages today, but we can draw the conclusion from what these psychologists have asserted, that the uncanny is indeed a variation of fear that arises in us when we encounter phenomena we cannot easily explain, or something defies our more primitive understanding of the world. An example of this primitive understanding would be our

more primitive belief that dolls are alive when we sleep, a belief many of us have when we are children. Understanding, however, the uncanny is the first step to being able to utilize it in video games.

### 3.5.2 The Uncanny Valley

In 1970, the Japanese roboticist Masahiro Mori wrote the article ‘The Uncanny Valley’, see fig 1 (p.8), discussing how as robots appear more human-like, our sense of familiarity increases towards them. But if there would be something not quite right about them, they would start to lose familiarity. He uses the example of a prosthetic hand that might look human, but if we were to touch it we would notice its cold temperature and lack of soft tissue, thus removing our sense of familiarity towards it and making it uncanny. He refers to this as the Uncanny Valley.

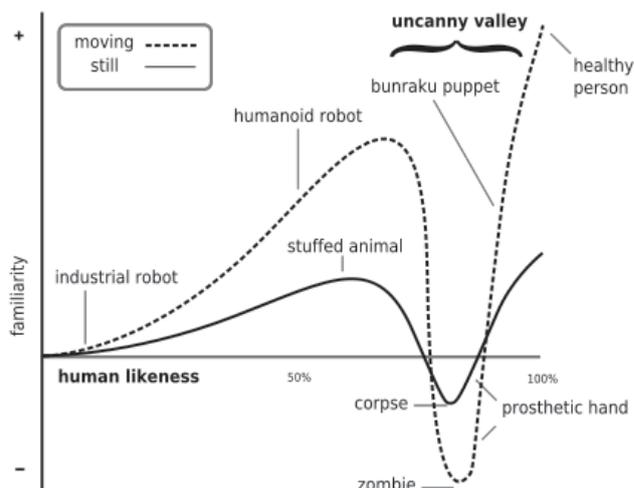


Fig. 1. Mori’s prediction of the Uncanny Valley

If you also add movement to this prosthetic hand, it will only magnify our sensation of strangeness. Even the slightest variations in movement can cause a robot or prosthetic hand to fall into the Uncanny Valley. Mori also uses an example from the World Expo held in Osaka that same year, where a robot had 29 artificial muscles in the face, so that it could imitate human-like facial expressions. If it were to laugh, but with a speed cut in half, it would look less familiar and more unnatural.

Mori believes we need to be careful when creating robots and aesthetic limbs, so that they do not fall in to the Uncanny Valley, but we keep our sense of familiarity.

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Mori's ideas have already gained a lot of attention in the video game industry, but we felt we should take a look at them nevertheless. Gaining a deeper understanding in how one might evoke feelings of uncanniness could prove quite useful in the horror game industry.

Mori's hypothesis has got a lot of attention in recent years, in the academic world as well as the non-academic, and has been the object of several studies. One of the main critics of the Uncanny Valley hypothesis is the robotics designer Dr. David Hanson who collaborated with Andrew Olney, Ismar Pereira & Marge Zielke, writing the paper 'Upending the Uncanny Valley'. In the paper Hanson et al. (2005) claimed that the Uncanny Valley, as described by Mori (1970), did not in fact exist, and that the robotics world should pay no heed to his warnings on realistic robots and their possible uncanniness.

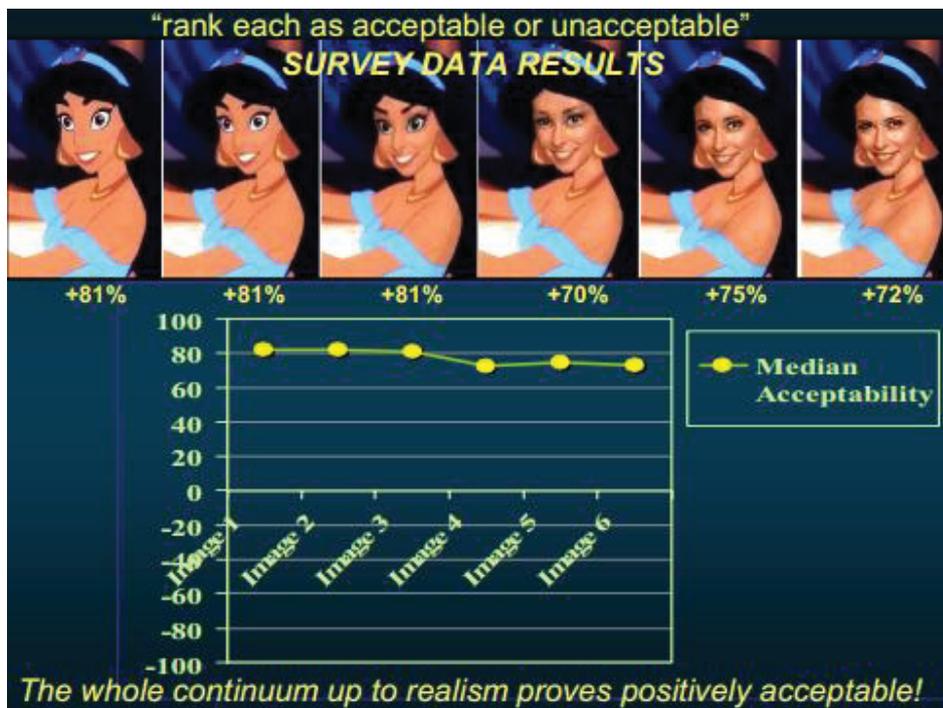


Fig. 2. The results of one test performed by Hanson et al. (2005).

Figure 2 (p.9) is shown in the previously mentioned paper by Hanson et al. and it represents the second of two tests that they carried out. Comparing these two figures one can easily see the divergence between Mori's claim and the tests performed by Hanson et al.

The controversy on the subject continues however, as a study by Schneider, Wang & Yang (2007) tested Mori's hypothesis using a variety of cartoon and video game characters. Basing

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their predictions on the hypothesis of the existence of the Uncanny Valley as proposed by Mori (1970); their tests concluded that the Uncanny Valley effect did indeed show itself, at the very least, in the depictions of humans and human-like characters in the virtual world.

While the scientific world has not come to a consensus on whether the Uncanny Valley truly exists, we have not been very swayed by Hanson's arguments and data, as we find the robots he shows in his paper to be somewhat uncanny, see fig 3 (p.10), despite his claims.



Fig. 3. Two Hanson robots, used by Hanson et al. (2005)

Mori was, however, not the first person to propose the notion that uncanniness has a relation to how similar a human creation is to something that is created by nature. Jentsch said in his previously discussed paper:

‘Incidentally, it is of considerable interest to see in this example how true art, in wise moderation, avoids the absolute and complete imitation of nature and living beings, well knowing that such an imitation can easily produce uneasiness’ (1906 p.10).

The fact that the idea of perfect human-made depictions of the world was something unnatural, and something that should be avoided, already existed in the early parts of the 1900's, is something that is quite fascinating, and something that would probably add to the current debate, as it shows that fear of things too similar to the living has existed for quite a while.

### 3.5.3 Uncanny Modality

Dr. Angela Tinwell and Dr. Mark Grimshaw at Bolton University presented an interesting paper at the Thinking After Dark Conference in Montreal, Canada, called ‘Survival Horror Games – An Uncanny Modality’.

Their study investigates the relationship between the perceived eeriness of a virtual character with the perception of human-likeness for some attributes of motion and sound.

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The 100 participants, of their study, were presented with 13 video clips of 12 different virtual characters and one human. They were then asked through a web-based questionnaire to rate them based on how human-like and familiar they seemed based on voice, looks and facial expressions.

The results revealed that the more a character lacks synchronization of sound and lip movement, the more eerie it becomes. They also noticed that for example an over-exaggeration of the mouth can exaggerate the uncanniness of a virtual character, and that this over-exaggeration is of greater significance than other parts of the face. (2009)

In conclusion, their study led to the following hypotheses:

1. Uncanniness increases with increasing perceptions of lack of human-likeness of the facial expression.
2. Uncanniness increases with increasing perceptions of lack of human-likeness of the character's voice.
3. Uncanniness increases strongly with increasing exaggeration of articulation of the mouth during speech and this relationship is of more significance than that between uncanniness and mid and upper facial expression.
4. Uncanniness increases with increasing perceptions of lack of synchronization between the character's lips and the character's sound.

They also suggest that the Uncanny Valley phenomenon can be harnessed in certain genres of video game for the purposes of increasing player fear and anxiety.

#### 3.5.4 **Distortion**

As mentioned in the background Blumstein & Récapet (2009) concluded, through tests on yellow-bellied marmots, that the adding of a non-linear sound to an alarm call increases how evocative the call is perceived to be. What the study proves is the hypothesis that non-linear sounds, created by a disproportionate amount of input versus output, has the function of intensifying the listener's reaction.

This study led to a paper written by Blumstein, Davitian & Kaye (2010) where they investigated the uses of non-linear audio in the movie industry. They conclude that the phenomenon discussed in the previously mentioned paper by Blumstein & Récapet (2009) is indeed used in the movie industry, both in the musically and in sound effects.

'Film score composers have traditionally used knowledge of the natural, nonlinear possibilities of

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western orchestral, musical instruments, to modify harmonic spectrum and perceived roughness (e.g. the *overblowing* of the brass and wind instruments, the metallic rasp of the *stopping* of the French horns (*Cuivré*) or directing the string players' bow strength and location).' (Blumstein et al. 2010 p. 753).

They continue to discuss the uses of non-linear sounds in classic films such as *King Kong* (1933, Directed by James Whale) or Hitchcock's film *The Birds* (1963); in which they created the monsters by manipulating organic sounds digitally and adding non-linearities.

Previously mentioned research would indicate that a proper use of distortion, or non-linearities if one prefers, could be used to call more attention to particular sounds. In nature they appear to be used to communicate terror, and proper usage of that could most likely have a strong effect on humans. As has already been seen in, for instance, the famous shower scene in *Psycho* (1960) where the woman's scream in the shower contains non-linearities, making her sound more frightened than she otherwise would.

### 3.6 SUMMARY

We can conclude from the research presented here that the uncanny is a feeling or eeriness, bordering on fear, which is produced by distorting or deforming something from its natural state. Thus proving our preconceptions about said object or person false. Some speculate that the reason we fear things that are 'unnatural' or 'uncanny' is that we, on an instinctual level, want to avoid things that carry disease. The things we find attractive are signs of health, and things we find unattractive or creepy are signs of lacking health. This hypothesis works well to explain why we would feel zombies to be uncanny, but find cartoon characters, who are in fact less like us than zombies are, to be normal. As the zombies clearly are unhealthy, and the cartoon characters, despite their lack of humanity, lack signs of disease. This hypothesis also makes sense when applied to the distortion research by Blumstein & Récipet (2009) wherein they describe the effect distortion has on alarm calls. The distortion in this situation is clearly a sign of danger, and is never produced in a healthy environment. One could argue at least that being mauled by a predator is unhealthy, and that the terror infused into the screaming alarm calls are a sign of lacking health, in the future at least.

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We subscribe to this hypothesis and believe that signs of disease are the root cause of the uncanniness in most of these cases. The hypothesis does not apply itself very well on Freud's discussion on superstition, and while we agree that uncanniness can be produced using means of superstition, we do not think it holds as much power in the fictional world, as people will be prepared for supernatural events when experiencing the horror stories we produce. Instead we believe in trying to scare them on their more instinctual and primitive level, by using the fear of disease.

## **4 APPROACH**

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### **4.1 INTRODUCTION**

We have been working on a short game level during the past two months. The point of said game was to create a playable demo that reflects the research we have done, and literature we have discussed during the previous chapters. In order to create it we chose to cooperate with several other students, and create a joint level. A level is a short part of a video game, it is comparable to a chapter in a book.

Each group has, after the main level was created, reshaped it to fit with their thesis. As we chose to work in such a large group, with a rather large scope at first, a lot of our work the past two months has been focused on producing assets.

The level we have created is meant to reflect our interpretations of what we have read in the literature, and convey our ideas on how one might use them in the video game development process. Our focus will lie in the hypothesis presented in the summary of the previous research chapter.

### **4.2 PROCEDURE**

The following text is a short description of how we worked as a team, and what framework we chose to follow when working as a large group.

#### **4.2.1 Leadership**

We chose to have two leaders within the group, whom were in charge of different areas. We had the ‘Project Leader’ and the ‘Creative Leader’. The project leader was in charge of efficiency, making sure deadlines were being met and that the group members were able to do their jobs without any unnecessary distractions. The creative leader had the final say in all things subjective. Should one use this shade of red or the other? Should the music have a deep bass or no? Such were the questions directed to the creative leader. His job is to make sure the product does not get side tracked from its original purpose. The creative leader’s job is to make sure all content matches his vision of the end product, so that it is concise.

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#### 4.2.2 **Method**

In order to work together efficiently, being the large group we were, we decided to discuss how we should organize ourselves. As we had some previous experience using SCRUM (Schwaber & Beedle 2002) we decided to make use of their framework. We did not however follow their framework religiously, and chose instead to adapt their ideas to fit us.

We sat down in the beginning of the production and agreed on what needed to be created in order for every group to be satisfied. We split our work into two week long ‘sprints’, which meant that we had a deadline every two weeks, forcing us to always work seriously rather than procrastinate. Each deadline had a ‘theme’. For instance the first deadline was preproduction, which meant all members of the group had certain objectives they needed to complete within their own area of expertise. In this particular theme each group member had to prepare themselves for the production phase, and make sure they were ready to work as efficiently as possible.

#### 4.2.3 **Trello**

We also made use of a website called ‘Trello’, created by Fog Creek Software, which essentially let us make use of digital post-it notes. This is quite helpful, as it allows us to create small and easy to use checklists that we can use to monitor the work of the rest of the group. This allowed us to speak with members who were having difficulties meeting their deadlines and solve the issues.

We as a group felt that controlling what each person did everyday was unnecessary. Instead we gave each group member a deadline, and let them plan their own work during each ‘sprint’. We did not have time to oversee and coach each member as they worked, and we believed this method would suit us well.

#### 4.2.4 **High Risk/Low Risk System**

When creating something as complex as a video game, a lot of assets are needed. There is also the possibility of people not being able to meet their deadlines. If one wants to be able to easily adjust one’s scope, and the project’s scope, one must be able to quickly evaluate different objects worth, in the big picture. What we mean by this is, for example, if one of the graphical artists cannot meet his deadline, we must be able to prioritise what things to cut from the production, to make room for this failure.



Fig. 4. High Risk/High Reward System

In order to do this we made use of what we like to call the High Risk/Low Risk system, see fig. 4. (p. 16). What one does in the beginning of a project is one first makes a list of all the things that need to be created, and evaluate them. For instance, in our game something that was quite important were the walls. These were essential to the level, for obvious reasons, one cannot simply run around underground without walls. These were according to the graphical artists quite difficult to create, thusly the walls were placed in the high risk/high reward box. Something that we wanted to add to the level was an area with water and sparking electricity. This however added only little value to the finished product, and was quite hard to create. Thusly it was put in the high risk/low reward box.

By splitting up our assets into these boxes, we knew what things needed to be created first, and our focus lay there. In short, it was a priority system.

#### 4.2.5 **Perforce**

We made use of a program called Perforce Visual Client (Perforce Software 2014) to help share our content in between group members. Perforce Visual Client is a software that allowed us to set up a server on one of our computers, where we could save our work and make it easily accessible to others within the group. We were also able to make use of Perforce's cooperation with Epic Games to integrate the program with UDK (see chapter 4. 3. 1). This allowed us to upload and download content made by others in the group from within the UDK editor. This made it very

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comfortable to work with. The reason we chose Perforce instead of any of its potential competitors is the fact that they offered UDK integration, which no other server software did.

### **4.3 PROCESS**

In order to create a game level one must first have a lot of assets or content. Things like walls, footstep sounds, etc. Thusly, when we started out working on this project, we focused on producing as much content as we could, that we would later be able to make use of it when creating the level. As neither one of us had the skills required to create graphical assets, and building levels, we decided to cooperate with several other students, whose strengths covered our weaknesses, and vice versa.

#### **4.3.1 Game Engines & Scripting Tools**

When creating our level we decided to use the Unreal Development Kit, henceforth known as 'UDK' (Epic Games Inc. 2014). This is a free game engine created by Epic Games Inc. We chose to make use of UDK because we have used it before and had enough experience with it to focus on our thesis instead of learning how to use the program. Since the rest of our group was also using UDK it was easy for us to help each other out without jumping between engines. There are obviously negative aspects of using this engine, for instance sound passes through walls and we cannot access the source code, forcing us to rely on scripting in UDK's own programming language UnrealScript. Scripting is programming, but within a certain framework. It is not possible to script things into existence that have not been programmed into the framework. UDK does not allow its users to create their own programmed content, but do allow them to modify the current code, via scripting. We have been able to work around these issues without any major problems however.

The other option we discussed was using XNA Game Studio (Microsoft 2006) to create a level in 2D instead of 3D. XNA Game Studio is an integrated development environment (IDE) for developing games. Using this would have been easier when working with distortion, since we would have been able to use shaders and this is something we have worked with before. Shaders are programs that tell the computer how to draw something in a special and unique way. For instance, you can add an image to your game and then tell the shader to change everything green in the picture to red. This can also be used far more creatively, to create special effects.

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But since we were focusing on the horror genre we thought that 3D would be the better option, mainly because we believe that it gives more immersion.

Alongside UDK we also developed and used a software created in Visual Studio (Microsoft 2013). It was created for our group to make things like scripting and managing projects less tedious. Since creating projects and classes with UDK is not as simple as for example in Visual Studio, having this program helps increase efficiency. As it allows us to create projects and classes easily. The software also has a text editor with auto-complete and several other features, that help a lot when working. One very handy thing is that you can create and run 'TestMaps' through the software, so that you do not have to open the UDK editor. 'TestMaps' allow you to start your game level as it currently is, and try it out. This saves a lot of time if you, for example, made a small change in the code, compiled it and then needed to test it out. Mainly because opening UDK can take some time, and it is not possible to compile code while UDK is active.

#### 4.3.2 ***Sound Design Tools***

To create the sounds used in the level we made use of the software known as Pro Tools 10 (Avid 2011). Pro Tools is widely considered to be the industry standard when it comes to audio recording and editing, especially in the music and film industries. Pro Tools has also been the default choice when working with audio related matters here at BTH, thusly it was the natural choice when it came to choosing a digital audio workstation. This being as we were most comfortable and had the most experience using this particular software. Pro Tools allows the user, as mentioned previously, to record and edit sound, which was needed in this project, as sound came to matter a great deal.

To create our recordings we also made use of standard sound equipment such as microphones, XLR-cables and the university's local studio. Choice of microphone often depended on what we chose to record. For instance, when we wanted to record the footsteps of the main character we knew we would get a lot of unnecessary noises, particularly from the trousers of the foley artist. For those unaware, a foley artist is a person who creates sound effects by performing actions, which are recorded by another person. In order to avoid recording these unnecessary sounds we chose to use a shotgun-mic. More specifically we used the Røde NTG-2. Since the shotgun-microphones are highly directional we could use it to capture the sound of the feet, while not picking up the sound of the clothes.

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In other situations we wanted a very quiet microphone, that is to say a microphone which does not pick up a lot of background noise. This might be because the sound we wished to record was very quiet, and thus in order to use it in a game setting later we would have to record it with a high gain level often resulting in unnecessary static and noise being recorded as well. For this we commonly picked the Røde NT1-A, as it claims to be the most quiet studio microphone in the world (RØDE Microphones 1967).

#### 4.3.3 ***Post-Process Effects***

When we finished creating content for the level, and everyone added their assets to our joint-level, we started work on implementing our research into the game. Our interpretation of Mori's 'Uncanny Valley' phenomena (1970) was that anything that has been properly distorted will evoke emotions of an uncanny or eerie nature. Thusly our first thought was to deform and distort the environment of the level we had created. To do this we experimented with UDK's post-process effects. Post-process effects are effects added to visual or audio content after the normal processing of them has been finished.

We wanted to create a level that started out with a normal 'state' that was later deformed into its distorted state. Our reasoning behind having a normal 'state' was that the distorted 'state' would have a greater impact on the player, if they had a concept of what was supposed to be normal first.

After looking at some of the different options UDK gave us, we decided to use an effect called 'Ambient Occlusion', see fig. 5. (p.20). We chose to use 'Ambient Occlusion' as few of the other effects distorted the level quite as much. It also fit with our hypothesis, helping to make the environment feel more 'sick' or 'unnatural'. We combined this visual effect with music we wrote in order to evoke discomfort in the listener. We used a combination of synthesizers and audio post processing, adding distortion to some of the instruments, to create the piece. Making liberal use of automated pan in order to make the piece more confusing, we tried to simulate the feelings of being ill. We let an acquaintance try the demo at this point, and she did not feel that the 'Ambient Occlusion' effect was all that disturbing. To remedy this, and stay true to our theme of confusion and discomfort, we made the 'Ambient Occlusion' effect pulsate regularly; to add a sense of unholy life to the environment.



Fig. 5. Ambient Occlusion effect in our playable demo.

As a transition to the distorted 'state' we decided to make use of an effect called 'Uber Post Process Effect', see fig. 6. (p. 21). This effect allowed us to add 'grain' to the player's vision, which took away a large portion of his sight. It was faded in, which gave the illusion of the player slowly losing control of his senses. To complement this, the sound event we created also faded in noise that gradually removed the player's ability to hear anything.

The end scene of the game was a chase scene down a long corridor, darkness starts far off in the distance and closes in on you. The scene was quite powerful in our opinion, but lost a lot of its effect when using the 'Ambient Occlusion' effect. Thusly, toward the end of the game we needed another transition, back to the normal 'state'. We chose to transition somewhat differently this time. We attempted to simulate, in our transition back to reality, the act of blinking by using the same grain effect we used previously. This time however, we let it blink at irregular intervals along with noise. We use this as a metaphor for the player blinking his vision back to reality.

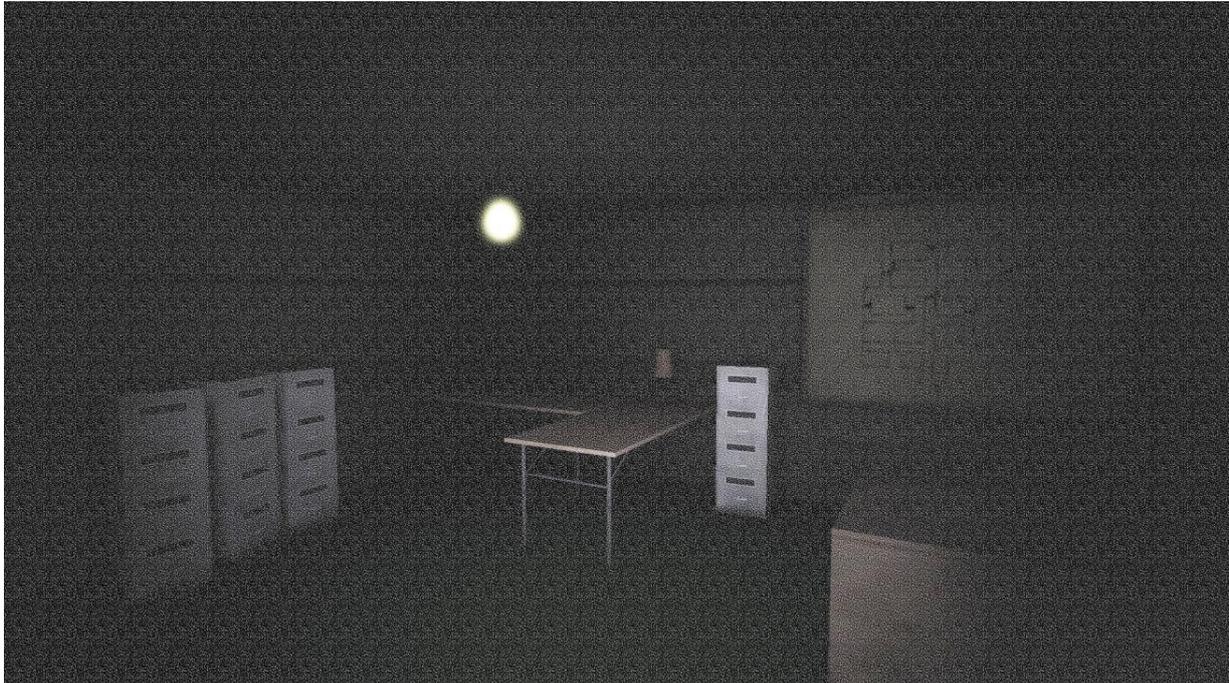


Fig. 6. Uber Post Process Effect in our playable demo.

To end the game, we once again made use of the ‘grain’ effect. This time we fade it in as the player is (hopefully) running from his inevitable doom. This symbolises the main character succumbing to the madness that is the distorted level. We felt that this ending concurred with the theme we followed during the course of the game.

#### **4.4 SUMMARY**

We have during the past two months successfully created our playable level. We did so by cooperating with a larger group. This was quite helpful, as it provided us with expertise we did not have. There were however limitations to the helpfulness of this, as the other group members also had their own theses to contend with. Thusly, we could not always get exactly what we wanted from them, and had to make do sometimes.

While we were successful in creating our playable level, we do not feel we succeeded in creating the atmosphere we set out to. The following chapter will discuss why we feel we failed in this endeavour and what we might have done to improve the level.

## **5 RESULT & DISCUSSION**

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In this chapter we will be summarizing and discussing the work we have done during the previous chapters.

Originally we were planning on creating a far bigger and more varied level. We planned on including a short outdoor level, leading up to a factory, and said factory would house the cellar level that we actually created. The façade of the factory was finished, the walls, the roof, etc. Sadly we lacked the content to fill it up. We lacked this because we realised, after having started our work, that some of the graphical artists would not have enough time to create all this content. They were busy working on things that were crucial to their own theses and thusly, we had to cut away some of the fluff. We discussed internally which areas were the most important, and decided that the cellar under the factory would be the area that complemented each thesis best.

### **5.1 FREUD'S HYPOTHESES**

The creating of the cellar level went smoothly, after we discarded the things we had considered unnecessary. When we were able to remodel the level to fit with our hypotheses and research, we had to consider how much of it we could apply to the level. We chose to ignore some of Freud's hypotheses (see chapter 3.4.1, p.6), as we did not think we could implement all of them efficiently in such a small level. The idea of creating uncanniness through the help of repetition may not be unsound in itself, but one must nevertheless consider how effective it could be in a short level. If one walks around a dark cellar for a short amount of time, the repetition of, say a number, would not seem uncanny. Rather than that it would probably just seem like a badly executed attempt to appear mysterious. The problem with his hypothesis is that it was created based on the real world. Players of videogames are somewhat desensitised to things that would normally arouse fear in them, because of the knowledge that whatever is evoking these emotions in them is nothing more than fiction. Being safe behind the screen does not, in our experience, leave the video game players very vulnerable to haphazard attempts at scares. We postulate that the uncanniness evoked from examples, such as Freud's recurring number example, is aroused by a fear for one's own safety. One sees a pattern one cannot explain, and it continues to repeat itself in front of one's eyes, thusly confirming one's fear that something is happening, and that one is the protagonist of the horror story unfolding. In a videogame the player will already know that

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they are the protagonist of a horror story, so the immediate fear for one's safety is not as great. That is not to say one cannot make use of Freud's hypotheses and ideas, we found another way to apply them to the level. The level is somewhat reminiscent of a maze. All the walls look the same, combine this with the darkness and you can easily find yourself lost in corridors whom all look the same. Here we felt that we could make use of Freud's postulation on familiarity and its possible uncanniness. We hoped to leave players who get lost with the feeling of 'I've been here before', and that this might in itself be a cause for discomfort or uncanniness. That is also what we experienced from playing through the level ourselves. Even after playing it several times, we would sometimes get lost.

Most of our research has revolved around human-like objects being uncanny, but we wanted to take it one step further and attempt to apply it to the environment. By doing so we wanted to explore Freud's hypothesis of feeling uncanniness when the sense of familiarity is repressed. What we wanted was for the player to start in a normal environment, which to start off with feels familiar and safe. Then we wanted to take away the familiarity from the player by distorting the world around him. This would hopefully create a feeling of eeriness. Instead of focusing on graphical content like monsters, we relied on effects like post-processing to take what is already there and then apply distortion to it. The distortion effects could probably have worked just as well, if not better, with shaders. But since we had no previous experience using shaders in UDK, we decided to play it safe and waste as little time as possible. This allowed us to focus more on producing what we needed, instead of spending time learning an exorbitant amount of new things in UDK. In order to get the effects we wanted, we experimented with a lot of variables and discussed what we wanted to accomplish whilst doing so. Along with Freud's hypothesis of familiarity and the uncanny, we also decided to make use of the idea that the fear of disease has a significant role in evoking eeriness. To accomplish this we put a red pulsating outline on the environment. Not having it pulsate was in our opinion not enough, it did not feel as alive and threatening. The red colour is meant to represent sickness or blood, and we thought it was the most convincing of the colours we tested.

## **5.2 SCRIPTING & PROGRAMMING**

To be able to implement everything, and make proper adjustments make these things work, a lot of scripting and programming was required.

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Things like making the player walk, having the right animations, adjusting the post-processing etc. were all needed to create a polished product. When it came to the 2D demo even more programming was needed, since UDK gave us a lot more to work with, compared to XNA, outside of scripting, e.g. the editor. Since it took a whole week to develop, we did not have much time for fine tuning things like the collision with walls and various objects. We did however feel that this was not particularly important, as long as the shaders and progression between the states worked as intended.

When adjusting the post-process effects of the 3D demo, we created a few classes and functions to make the pulsating and grain increment work. Functions are used in almost any programming language, and you can use them to group pieces of code in a more logical way.

This was done in the 'PlayerTick' function. The specific function is called every 'tick', which is the routine called every time the game state is updated. As soon as we tell the pulsating effect to start through the editor, the counter begins and increases or decreases the radius of the effect, depending on the value it starts with. This works almost the same way for the grain, except here we keep increasing it until it reaches a certain max value.

Even though Carolin did all of the programming and scripting, they both discussed how the mechanics would work before implementing them.

### 5.3 MUSIC WRITING

To complement this we wrote a musical piece. As mentioned previously we made use of synthesizers and distortion effects when making the music. We wanted the music to be somewhat ambient, as the focus of the player was meant to lie in the distorted environment rather than on the music. Therefore we avoided any distinct melodies, and made it somewhat messy instead. We were quite satisfied with how the music turned out, but we wanted it to feel more alive, moving, and because of this we turned to the research done by Blumstein & Récapet (2009). They noted that distortion had the effect of making alarm calls more distinguishable in their test on marmots. We thought we could make use of this in our music, by adding a distorted synth. We let this synth pan back and forth, for the same reason we chose to have the 'Ambient Occlusion' effect pulsate. In an attempt to make the level and environment feel more alive.

At the end of the level we wanted the player to feel chased by darkness. To do this we forced the player into a long corridor and successively turned off the lights behind him at an ever increasing

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pace. To complement this music wise we wrote a piece whose goal was to increase the tension felt by the listener, until the piece ended. We made use of reversed tremolo violins, and other violins whose pitch increase for the entirety of the piece's duration. These particular violins were chosen as they increase the tension in the listener, by never giving the listener an 'ending'. The constant movement of the violins leave the listener anticipating a resolution, that we do not give him until the piece has ended. We combined this with a constant increase in tempo, which was synced with the lamps. The drums were also synced with this, so every time a light went out it was synchronised with a drumbeat. We felt that the combination of these things created a rather impactful musical piece, and it made the ending corridor scene quite powerful.

#### 5.4 ORGANIC VS NON-ORGANIC

Something we have reflected on is the effectiveness of our usage of post-process effects. What we wanted to simulate was an environment that goes from a normal 'state', to a distorted and 'sick state'. We attempted to do this with the use of post-process effects, but in the end, we found its effectiveness lacking. We started discussing why this might be, and we remembered that games like Silent Hill 3 (Konami 2003) and Dragon Age: Origins (BioWare 2009) have made use of effects like these. Not necessarily post-process, but they have made use of the switching of 'states' from normal to distorted. Something these games have used instead of post-process was graphical changes in the level, more specifically, they have changed unliving, dead, environments to organic environments full of life, see fig. 7. (p. 25).

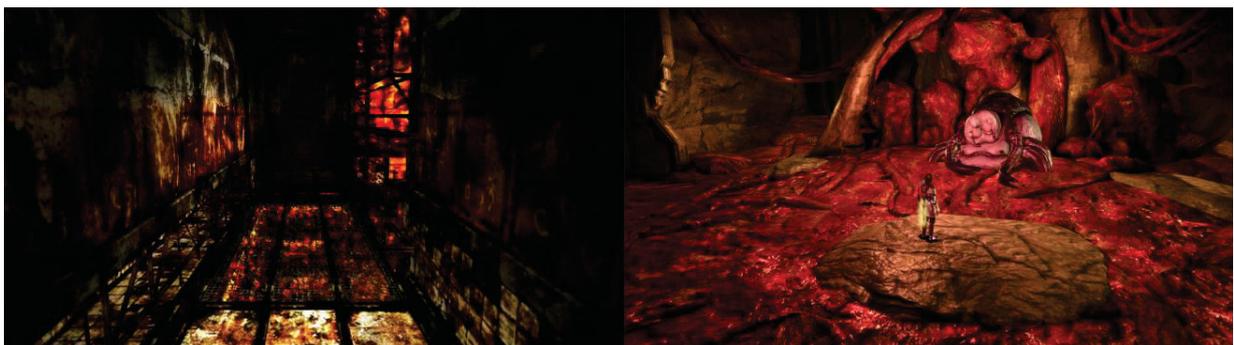


Fig. 7. Silent Hill 3 (Left) and Dragon Age: Origins (Right)

If one is to consider the hypothesis that 'things whom give off the aura of illness are uncanny' it would make sense to change the environment into a living organism, when one wants to make it

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uncanny or scary. Stone, brick and mortar cannot get sick. Mould, however, can grow on them. Metal can rust, water can hollow out walls or floors. There are several ways to make an environment feel sick and wrong, but all of the examples make use of graphical assets. As we did not have the ability to create graphical assets ourselves, and the switching of states was unique to our thesis, we could not get help from our group members; this was not possible to implement.

We do however feel that if we had the option of changing the environment on a graphical level, it would have been more effective. When comparing our game level to Silent Hill 3 or Dragon Age: Origins, we felt that we came up short. We believe this is because we were unable to change the actual game world, and only distorted it with the help of post-process effects. This did not fit as well with our hypothesis in chapter 1 as we had initially thought it would.

### **5.5 PROJECT ZERO FRANCHISE**

When it comes to post-process effects, one larger horror-game franchise comes to mind, and that is Project Zero (Tecmo 2001), also known as Fatal Frame. The Project Zero franchise uses post-process effects similar to our grain effect, see fig. 6. (p. 21). They use it as part of a game mechanic. When ghosts are nearby, the world darkens and the grain effect they use gets successively stronger the closer you are to a ghost. Their usage of the effect differed a great deal from ours. Where we tried to scare the player with only the effect, the Project Zero franchise used the effect to inform you of a nearby danger. Depending on how scary the monsters of the game are, this can be a more or less effective tactic. It is nevertheless, a more clever usage of the effect, compared to ours. The point of our research however, was finding a way to make horror games scary without the usage of monsters, so we could not have copied their method exactly either way. Using it as a warning signal might not be a bad idea though.

### **5.6 THE LEGEND OF ZELDA: A LINK TO THE PAST DEMO**

After doing some of our research we decided to test some of the things we had read. This was before we started working on our main game level. We did this by creating a small 2D game based on the game The Legend of Zelda: A Link to the Past (Nintendo 1991). The reason we chose to make it in 2D was because we think it is much easier to find graphical content. Using content from an old game was inspired by urban legends we found online about ‘cursed’ used games, which created some uncanny stories. The story we are referring to in particular is

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commonly known as ‘Ben Drowned’ (Hall, A 2010). It revolves around an internet user named ‘Jadusable’ who buys a used version of the Nintendo game *The Legend of Zelda: Majora’s Mask* (2000). This game was, according to ‘Jadusable’ cursed, and he told a story narrated in a way that was convincing and creepy enough to become widespread on the internet. A link to the story will be provided among the references for those interested.

To make it easier on ourselves we used XNA Game Studio to create it, mainly because we have a lot of experience with it. It took us about a week to make and when it was done we managed to get a few people to test it. This is where we first attempted to use the familiarity hypothesis. The game started out with normal colours and music, and the player was walking around doing quests for NPC characters. These are non-player characters, meaning a character that is not controlled by a player. After a specific quest however, the game would start to change. Our goal was to distort the village to the point where it was eerie even though it was harmless. To accomplish this we used both shaders and changes in the music. The whole game was divided into three different ‘levels’, see fig. 8. (p. 27).



Fig. 8. Our 2D demo based of *Legend of Zelda: A Link to the Past*

The light and normal one was where the player started out. There was no distortion whatsoever in this level. The second level would make the colours a bit darker and the music slightly distorted. We also added a slight wave effect that was moving across the screen. The third and last level had a hint of red, random flashes of red and even more distorted music. The wave effect was also more exaggerated here. Even the NPC characters would change, with the way they spoke and their eyes would go red in the last level.

When it was done and tested, we did not feel that we succeeded in what we tried to accomplish. We discussed why what we had done was not enough, and thought of a few reasons; it might have been because the game was not long enough to immerse the player in it, or perhaps we did

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not use the distortion correctly. We still felt that this game was a good start, and it shows how far we have come since. It was also discussed between us that maybe 2D was not such a good idea for our main game level later on. Mainly because it will be such a short game and we feel that one needs more time to get fully immersed in a 2D game compared to a 3D game.

### **5.7 REFLECTION ON POST-PROCESS EFFECTS**

Something we have considered in hindsight, which might have made our usage of post-process effects more impactful, would have been to strengthen the dynamic differences between the 'states'. That is to say, if our normal state had been more serene, brighter, happier, etc. Then perhaps the switch over to the dark distorted world would have had a greater impact. One could argue that this would not have mattered, as the distorted world was only distorted by the way of post-process effects, and that one would need a more organic level, wherein the graphics changed along with the states, to truly create the effect we were after. This is not something we can be sure of without testing several different versions of the level, and certainly not something we can create in the time period we had to make use of. We do believe however that our mistake lay in not focusing on the graphics. Sadly this is not something we could have remedied as neither of us possess the skills required to create graphical assets for videogames.

### **5.8 FINAL REFLECTION**

To summarize the project we would have to say that, while we may not have succeeded with creating the exact atmosphere we set out to, we still learned a lot. We were also able to meet most of our own deadlines, which is always quite helpful. Whilst researching the eerie and scary we found the uncanny valley phenomena to be a goldmine, when it came to scientific discussion. The controversy it created had sparked a lot of debate and several studies had tried to uncover the truth behind the hypothesis. While we may have had our preconceptions about the idea, we still strived to find arguments from both sides of the discussion, in order to further educate ourselves. Stumbling across the papers written by Freud and Jentsch was also something we felt helped us greatly; as it gave us a new perspective on the discussion that is being held today, regarding the uncanny valley phenomena. Already in the early 18<sup>th</sup> century, there were people discussing the phenomena that was later proposed by Mori in 1970.

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When it came to actually developing our own playable game level we were also quite successful. When we realised that not all people could handle their specific deadlines, we were quickly and efficiently able to resize our scope; that we could present a finished product by the end of the project. We implemented our ideas into the level as we had planned to from the start, and while we realised that it did not successfully create the intended effect, not in the magnitude we had hoped for at least. We still felt that the level represented our ideas. Not every idea can be correct, and life is filled with small failures. We feel however that our hypothesis is not entirely wrong, it only needs refinement. As mentioned in the previous chapters our current belief is that our mistake lay in only using post-process effects. If we had been able to make use of a greater variety of graphical content, that went from non-organic to organic, we might still have been able to create the atmosphere that we set out to create.

## 6 GLOSSARY

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**Asset:** In the text we use the term as a summarization of different kinds of content used in creating games. For instance, a 3D Tree made in a 3D program would be a graphical asset, or the footsteps of the characters are a sound asset.

**Class:** Often used in programming and scripting. A class is the blueprint from which individual objects are created. For example if you have three bicycles of the same model, each one of them were created using the same blueprint and components. This means that one of them is an instance of the class of objects known as bicycles.

**Distortion:** By distortion we mean the warping or deforming of something, changing its original form.

**Foley Artist:** A person who creates sound effects by performing actions, which are recorded by another person.

**Post-Process:** Post-process refers to the editing of content after it has gone through its normal processing stages. Examples of post-process effects are motion blur, colour enhancement, bloom, etc.

**TestMap:** A feature in our software created to work with UDK. We discovered it in the book 'Unreal Development Kit Game Programming with UnrealScript: Beginner's Guide' (2011). It allows its user to start the level they are currently working on, along with a command window logging all the code's actions; without opening the editor.

**UDK:** Unreal Development Kit, a free version of the Unreal Engine 3. It allows its users to create video games powered by *Epic Games Inc.* Unreal Engine 3.

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